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DIFFERENTIAL PATIENT RESPONSE TO INSTRUCTION, COUNSELING, AND DENTAL TREATMENT. PAPER PRESENTED AT A NATIONAL SEMINAR ON ADULT EDUCATION RESEARCH (CHICAGO, FEBRUARY 11-13, 1968).

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RESEARCH (1) ANALYZED SPECIFIC OUTCOMES OF COUNSELING, INSTRUCTION, AND DENTAL THERAPY, AND (2) DETERMINED THE RELATIVE EFFECTIVENESS OF PATIENT EDUCATION FOR RELIEF OF TEMPOROMANDIBULAR JOINT (TMJ) DYSFUNCTION. SIXTY ADULT PATIENTS ATTENDING THE UNIVERSITY OF ILLINOIS TMJ RESEARCH CENTER WERE RANDOMLY ASSIGNED TO ONE OF THREE PROGRAMS--DENTISTRY, DENTISTRY AND INSTRUCTION, OR DENTISTRY AND COUNSELING. IN THE PRETEST STAGE, A DENTAL EXAMINATION DETERMINED THE SEVERITY OF THE DYSFUNCTION, AND INTERVIEWS AND TESTING DETERMINED MOTIVATION FOR COUNSELING, EDUCATIONAL LEVEL, KNOWLEDGE OF THE DYSFUNCTION, AND SELF-CONCEPT. RESULTS INDICATED THAT--(1) DENTAL TREATMENT COMBINED WITH INSTRUCTION OR COUNSELING IS SUPERIOR TO DENTAL TREATMENT, (2) DENTAL TREATMENT AND INSTRUCTION ARE SUPERIOR TO DENTAL TREATMENT ALONE OR COMBINED WITH COUNSELING, AND (3) THE COMBINATION OF COUNSELING AND DENTAL TREATMENT IS SUPERIOR TO EITHER DENTISTRY ALONE OR COMBINED WITH INSTRUCTION IN DECREASING A PATIENT'S NEGATIVE FEELINGS ABOUT HIMSELF. AN ABSTRACT OF A DOCTORAL THESIS, THIS PAPER WAS PRESENTED AT A NATIONAL SEMINAR ON ADULT EDUCATION RESEARCH (CHICAGO, FEBRUARY 11-13, 1968). (PT)

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DIFFERENTIAL PATIENT RESPONSE TO INSTRUCTION, COUNSELING, AND DENTAL TREATMENT

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AN ABSTRACT OF A DISSERTATION

SUBMITTED TO THE FACULTY OF THE DIVISION OF SOCIAL SCIENCES

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Introduction

Education and Society

The belief in education as one of the major instruments of societal as well as personal change is a hallowed tradition of American culture. However, the educational system is also shaped by the very social order it seeks to mould. The interaction of the needs of contemporary society and of our educational system is particularly striking in the area of public health education. The specific goals of public health education programs cover a braod range, but the overriding objective of such programs is to improve the health of society through education of the individual member.

Patient Education

An important subdivision of public health education is patient education. The many educational programs aimed at the victims of disease and designed to inform them about their condition, its treatment, and the part they can play in its control or elimination belong to this category. Those charged with the development and implementation of patient education programs are concerned with the design of effective learning experiences for their patients. Since these patients most often learn in informal and non-academic settings and since many are adults whose experience and other characteristics make their participation in a teaching-learning experience quite different from that of children, much that has been learned about program design in the broader field of adult education is relevant to program planning in patient education.

Empirical Program Analysis

Interest in an empirical approach to the development and experimental evaluation of programs is growing among adult educators.[1] One reason for this growing interest is that the problem of securing the adoption of helpful innovations, which is a continuing one in education, has become particularly acute in adult education. Adult educators are increasingly looked to for new solutions to the multifaceted educational problems of the victims of poverty and disease. A clear understanding of the nature and outcomes of the major experiences involved in an educational program can provide a firm base both for the development and subsequent evaluation of such innovations. The significance of the research reported in this dissertation lies in the fact that it is an experimental analysis of specific programs of adult patient education that focused on the effects of a set of educational and non-educational experiences in a single setting.

Purpose of the Research

The research has two major objectives: first, the analysis of specific outcomes of three significant human experiences, counseling, instruction, and dental therapy to gain a clearer understanding of the nature of these experiences; second, a determination of the relative effectiveness of the patient education components of treatment programs for the relief of a major problem of dental medicine, Temporomandibular Joint (TMJ) dysfunction. The research tasks, therefore, consisted of the development of two patient education programs on the basis of previous research, an experimental analysis of the health, cognitive, and affective

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[1] E. Wheeler, "Education for Neighborhood Survival," Adult Leadership V. No. 1 (January 1967), 220-221, and 229.

outcomes of these programs, and the determination of the presence of any meaningful relationships among the factors identified as potentially relevant to the patients' differential response to the programs. The two patient education programs--one cognitively oriented, involving tutorial sessions, and the other affectively oriented, involving individual counseling--were designed, implemented, and compared to a third, non-educational, dental treatment program. The analysis of the effectiveness of these programs provided a rare opportunity to study in a single setting the effects of a set of educational experiences--counseling and instruction--as compared to a set of non-educational experiences--dental treatment, as they related to cognitive, affective, and health goals.

Theoretical Background and Review of the Literature

Recent Developments in Educational Research

Certain developments in related fields of knowledge have contributed to the theoretical context for developing a conceptual framework for program design and for its empirical validation. The first is from the field of education. Current trends in educational theory, as represented by Bloom, Rogers, and Devereaux, reflect a change in the understanding of the educational process that includes objectives and settings extending beyond the traditional cognitive goals of classroom and lecture hall. Consequently, it is possible to examine the educational process in the less formal setting of the doctor's office or dental clinic and to include in the analysis those affective goals that are so often closely linked to treatment outcome.

The second development consists of the beginning of a climate of objective evaluation of health and patient education programs. It also includes the development of various conceptual frameworks for viewing program design in adult education, which can be applied to the more specialized field of patient education.

Recent Developments in TMJ Dysfunction Research

The third development is a new understanding of the etiology and treatment of a complicated disorder of dental medicine, temporomandibular joint (TMJ) dysfunction. Present clinical practice based on diverse understandings of the dysfunction permits of distinct cognitive, affective, and biomechanical approaches to its treatment, and thus allows for a comparative evaluation of treatment programs based on these approaches.

TMJ dysfunction is a syndrome consisting of painful symptoms extending over the side of the head, face, and neck frequently conjoined with limitation of movement and crepitation of the joint. The dental and medical literature reflects three distinct points of view regarding the nature of the condition and the most appropriate form of treatment. These three points of view may be termed biomechanical, functional, and psychosomatic depending upon the emphasis they give to certain aspects of the dysfunction.

The Biomechanical Approach-

The first point of view represents a traditional medical and dental orientation. TMJ dysfunction, as seen from this vantage point, is the result of physical trauma to the joint arising from an accident to the jaw or from malocclusion with or without accompanying arthritic changes of the joint itself or attendant muscular incoordination. The advocates of this position advise a dental or medical procedure for successful treatment.[1] These advocates have not engaged in experimental research to any significant degree, but have drawn largely on clinical experience and case studies for support of their position.

The Functional Approach-

The second point of view looks upon TMJ dysfunction as the result, to a large extent at least, of the development of destructive oral habits such as tooth clenching, biting on hard objects, and other similar practices.

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[1] C. W. Miller, "The Temporomandibular Joint, "The Journal of the American Dental Association, LIV (April, 1952), 393. See also A. C. Fonder, et al., "Malocclusion as it Relates to General Health," Illinois Dental Journal, XXX IV, No. 5 (May 1965), 292-297.

A major proponent of this view, Chasens, suggests a therapy program in which information designed to assist the patient in self-management of the dysfunction is integral.[1] Wooten, on the basis of his clinical experience, recommends a treatment program that involves extensive information-giving to the patient. In his experience this program frequently resulted in both relief of the pain-dysfunction TMJ syndrome and the cessation of destructive oral habits regardless of whether the patient was actually relieved of his underlying anxieties or emotional problems through some more directly affective means.[2]

The following implication can be drawn from an analysis of the literature of this second school of thought: a dental program that includes patient instruction directed toward eliminating faulty oral habits, informing the patient of more constructive ways of dealing with nervous tension, and reducing the anxieties attendant to the onset of TMJ dysfunction symptoms through a clear presentation of the nature and treatment of the condition is essential to its affective alleviation.

The Psychosomatic Approach

The third point of view emphasizes the psychological aspects of the dysfunction. In one of the few experimental studies so far undertaken to provide evidence over and above the clinical impressions of writers in the field, McCall was able to distinguish, through the use of the Minnesota Multiphasic Personality Inventory (MMPI), a personality pattern for TMJ patients that differentiated them from other dental patients and from

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[1]Abram I. Chasens, "Occlusal Disharmony and TMJ Disturbances as a Source of Pain,""Journal of Dental Medicine, XII, (July 1957), 107-118.

[2]J. W. Wooten, Op. cit., 970.

medical patients awaiting major surgery.[1] Largely in the nature of a pilot investigation, this study was highly tentative, and the authors have not pursued the inquiry further.

An additional indication of the importance of psychological factors in TMJ dysfunction is furnished by Moulton who, using a diagnostic psychiatric interview of one hour duration with each of thirty-six patients, found only four who seemed, in her judgment, to be "relatively healthy people from a psychiatric point of view."[2] This study suffers from the highly subjective technique used and from the tendency of the author to assume the validity of Freudian theories of oral fixation and the repression of aggression. The clinical investigators of the psychosomatic school have drawn the implication that effective treatment of TMJ dysfunction must come to grips with the psychological dimensions of the patients' malady and cannot be restricted to physical procedures alone. None of these investigators has advanced any clear-cut proposals for developing a treatment program that would take cognizance of the alleged psychological components of the dysfunction.

It is clear that while there is disagreement in medical and dental circles over the etiology and treatment of TMJ dysfunction, there is considerable justification for asserting that the dysfunction has dimensions that can be approached through programs of therapy embodying cognitive and affective educational objectives, as well as the traditional biomechanical goals of dentistry.

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[1] C. M. McCall, et. al., "Personality Characteristics of TMJ Patients," The Journal of the American Dental Association, LXII, No. 5 (May, 1961), p. 694-694

[2] R. E. Moulton, "Psychiatric Considerations in Maxillofacial Pain." The Journal of the American Dental Association, LI, No. 4 (October 1955) pp. 408-412.

Factors Influencing Adults' Response to Patient Education Programs

Programs of patient education do not exist in a vacuum. If there efficacy is to be evaluated in an objective manner, it is most important to isolate other factors in addition to the programs, themselves, that may influence the response of patients. Previous research has indicated certain social and psychological factors associated with the incidence of TMJ dysfunction and with the patient's response to programs of counseling and instruction. Specifically, motivation for counseling and educational level have been isolated as significantly related to the response of adults to programs of counseling and of instruction. Investigators have frequently noted positive associations between educational level and a favorable prognosis.[1] A patient's motivation for counseling is often cited as predictive of his ability to profit from the experience.[2] Better educated patients are also more likely to learn more from instructional programs.[3]

Introduction to the Major Hypotheses

Previous clinical investigations of TMJ dysfunction have furnished grounds for suspecting that patient education programs consisting of individual counseling or tutorial sessions would be a valuable addition to

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[1]Mark Spivak, "Factors Influencing the Formation of a Patient-Percent by Psychiatrists Following the Initial Interview," unpublished Ph.D. dissertation, Dept. of Psychology, The University of Michigan.

[2]H. J. Cross, "The Outcome of Psychotherapy: A Selected Analysis of Research Findings," Journal of Counseling Psychology XXVIII, (October, 1964), pp 413-417.

3. Leonard Syme, "Interpersonal Relations and Medical Care in an Infertility Clinic: A Case Study of a Service Institution," unpublished Ph,D. dissertation, Department of Sociology, Yale University.

traditional dental therapy in alleviating the dysfunction. Patient education programs were developed to attain distinct educational goals of a cognitive or affective nature. In keeping with the treatment recommendations of the psychosomatic school of thought, the counseling program had for its goals an affective objective, the development of effective methods of relieving tension and anxiety. In line with the implications of the advocates of the functional approach, the tutorial program had as its goal the imparting of factual information relative to the nature and treatment of the dysfunction.

As has been indicated, two of the major schools of thought see the disorder as having a large emotional component or as being subject to considerable voluntary control by the patient himself. Epidemiological studies of the disorder indicate that most often those seeking treatment for TMJ dysfunction are middle class, of better than average education.[1] Furthermore, research into the response of patients to counseling and instruction programs generally indicates that better educated patients profit most from such verbal methods of problem solving.[2]

Since it is alleged that emotional or voluntary factors are involved in TMJ dysfunction, it is reasonable to expect that treatment programs designed to deal with these factors, either by counseling or by instruction, will be more effective than a program that is restricted to the physiological and biomechanical aspects of the problem.

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[1] Arnold Franks, "The Social Character of TMJ Dysfunction," The Dental Practitioner, XV, No. 3 (November, 1964), 94-100.

[2] L. Syme, op. cit.

In view of the foregoing considerations--that there are, allegedly, major cognitive and affective components to the dysfunction, and that many TMJ patients belong to a group that, by and large, is best able to utilize such verbal methods of problem solving as instruction and counseling--it is expected that programs that combined the patient education and dental treatment would be more affective in alleviating the dysfunction than the program consisting of dentistry along (first major hypothesis). It was also expected that since the major objective of the program of patient instruction was the imparting of factual information, these patients would in fact learn more about the nature and treatment of the dysfunction than the dentistry alone group or the group receiving counseling (second major hypothesis). Since a man restored to good health usually feels better emotionally and since the dysfunction is alleged to have a major emotional component, at the conclusion of treatment the physically healthier patients were expected to show the least self-concept discrepancy (third major hypothesis).[1]

Statement of the Major Hypotheses

1. Participants in the patient education programs of instruction or counseling will show greater symptom reduction in response to treatment than patients in the program of dentistry alone.[2]
2. Those patients who participate in the program of dentistry and instruction will show greater comprehension of the nature and treatment of TMJ dysfunction than the other patients.
3. At the conclusion of treatment, those patients with less severe TMJ dysfunction will also show the lesser self-concept discrepancy.

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[1]Discrepancy between an individual's real and ideal self-description was taken as a measure of his overall psychological adjustment in this experiment.

[2]The .05 level of confidence was used for rejection of the null hypothesis in this investigation.

Introduction to the Minor Hypotheses

The three minor hypotheses of the experiment expressed an expectation that, although the general trend of the outcomes of the three treatment programs would follow the pattern outlined in the major hypotheses, there was a possibility that within the treatment groups would be subgroups of individuals characterized by certain affective factors who would respond to the programs in a distinctive way. It was expected that those patients in the dentistry alone program (biomechanical approach) who gave initial indication of needing and being able to profit from counseling would show greater discrepancy in self-concept than the rest of the patients in the group at the end of that treatment (first minor hypothesis).

Although the counseling program was not aimed at any profound changes, those patients who developed, through counseling, more effective ways of coping with the stresses of life were expected to be less dependent upon physical symptoms and illness to allay anxiety and would show less self-concept discrepancy than those patients who did not appear to benefit from the counseling programs (second minor hypothesis).[1] It was further expected that the TMJ patients would include a group resistant to any direct effort to deal with emotional problems.[2] This group was identified as the "less motivated" for counseling. This lesser degree of motivation for counseling may be due to a refusal to acknowledge the need for such help, or simply to the fact that no

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[1] Helen H. Avent, "Short-term Treatment Under Auspices of a Medical Insurance Plan, "The American Journal of Psychiatry, CXXII, No. 8 (August 1965) pp. 147-151.

[2] Timothy Leary, Interpersonal Diagnosis of Personality, (New York: The Roland Press, 1957), pp. 315-331.

serious emotional problems are present. Regardless of the reason for the lack of motivation, it was expected that these patients would find a more directly cognitive approach such as the instruction program more congenial (third minor hypothesis). The reason underlying this expectation was that TMJ patients are characteristically better educated than the average person and that educational level has been found to be an important factor relating to the response of patients to instruction programs.

Statement of the Minor Hypothese

1a. In the dentistry alone group, patients initially more motivated for counseling will show greater degrees of self-concept discrepancy at the conclusion of treatment than the rest of the patients in the group.

2a. In the group receiving dentistry and counseling, those judged by the counselor to have benefitted from the counseling sequence will also show improved physical health.

3a. Among those patients receiving instruction and dentistry, it is expected that patients rated as less motivated for counseling will also have fewer symptoms at the conclusion of treatment than the patients with greater degrees of motivation.

Of particular interest to the testing of a conceptual framework for program design was the identification, within the groups, of other variables that upon analysis seemed associated with the three treatment outcomes. No statement of specific hypotheses related to these associations was attempted beforehand, but they are discussed in the light of the hypotheses and the results of previous research.

Research Design

General Overview

The research tasks of this investigation concerned (1) the development of two programs of patient education based on previous theoretical writing and research; (2) their empirical validation through an analysis of the relative effectiveness of the two patient education and treatment programs as compared with the program restricted to dental treatment alone; and (3) the determination of the presence of any meaningful relationships among the factors identified as potentially relevant to the patients' differential response to the programs. Since the essential problem was one of measuring changes in behavior attributable to the different experiemental treatments, the general research design became the testing of one group of twenty patients before and immediate following the completion of their program; and then comparing any changes in the designated areas of patient behavior--symptoms, information, and self-concept discrepancy--with the changes resulting within the other two groups of twenty patients each, who were also tested prior to and immediately following the completion of their treatments.

The Treatment Programs

The experimental programs were conducted at the TMJ Research Center of the College of Dentistry of the University of Illinois at the Medical Center. They consisted of a counseling and dentistry treatment program, a tutorial instruction and dentistry program, and a dentistry alone program. The nature of the counseling was of the kind usually called "client-centered." The goals of the counseling sequence were alleviation of symptoms

and consequent improvement in functioning, rather than any deeper insights or personality change. The patient was seen for individual, half-hour sessions preceding the dental appointment.

The patient instruction program consisted of half-hour tutorial sessions preceding the weekly dental appointment. The content of the tutorial sessions was related to four subject matter areas: the etiology of TMJ dysfunction, the anatomy of the jaw and other related structures, the nature and purpose of the dental-medical treatments employed to alleviate the condition, and the measures by which the patient, himself, could manage the condition.

The dental treatment given to all three groups consisted of two stages: progressive relaxation of the muscles of mastication through the use of medication and dental appliances, known as "dental splints"; and correction of any malocclusion to prevent recurrence of muscular fatigue and spasm. All of the patients were undergoing treatment throughout the entire period of the experiment (eight months). Those patients who had not experienced significant amelioration during this time continued in treatment beyond the time limit set for the experiment. Those who did experience significant relief earlier than the sixth month were kept coming for weekly visits to check on the stability of their remission until the six month.

Population and Sample

The population to which the results of this experiment are most directly applicable is that of chronic TMJ dysfunction patients applying to university dental clinics for treatment. A sample of sixty such patients was drawn from those seen at the University of Illinois TMJ Research Center. The treatments

were randomly assigned to the patients as they applied for treatment until a total of sixty was reached. The treatment groups consisted of twenty patients each. Since these treatment groups were composed of adults engaged in patient education programs, it also seemed legitimate to further generalize to that wider population of adults engaged in a broad range of patient education programs.

Experimental Procedures

General Overview

An overall view of the procedures followed in the conduct of this inquiry into the effectiveness of the three programs of patient education and treatment reveals three stages. In the first, or pretest, stage the sixty patients received a dental evaluation to establish the presence and severity of their TMJ dysfunction. The examining dentist then gave the patients a rating on the TMJ Rating Scale, an instrument developed at the Research Center. The patients then participated in individual hour interviews with the investigator which provided material for a judgment on their motivation for counseling, educational level, and general knowledge of TMJ dysfunction. An additional objective of the interview was to establish rapport for the testing. The interview was followed by a testing session in which the patient completed the TMJ Knowledge Test developed by the author for this investigation, the "real-self" and "ideal-self" forms of the Interpersonal Adjective Checklist, and the Minnesota Multiphasic Personality Inventory. In this manner initial measures of the patient's knowledge of TMJ dysfunction, motivation for counseling, and self-concept discrepancy were obtained.

Upon completion of the intial evaluation, the sixty patients were randomly assigned to the three treatment groups. This was the start of the second, or treatment, stage of the experiment in which the patient participated in one of the three programs for a period of six months. All counseling and instructional sessions lasted a half hour and preceded the dental appointments. During the dental therapy the dentists were instructed to refrain from informal counseling or instruction, and subsequent spot-checking and questioning of the patients indicated that the dentists had complied with the instructions.

At the conclusion of the eight month period allowed for the experiment, all of the patients had completed six months of treatment and, entered the final, or posttest, stage. This stage consisted of a second dental evaluation and a second interview and testing session to obtain final measures of the variables.

Instrumentation

The reliability obtained for the raters using the TMJ Rating Scale was .89. The Interpersonal Adjective Checklist has been the subject of several validity and reliability studies.[1] The results of these studies have been sufficiently positive to justify the continued use of the ICL in both clinical practice and research.[2] The MMPI has been used extensively over the past thirty years in a wide range of research and is fairly well accepted as a useful instrument for psychological evaluation.[3]

The TMJ Knowledge Test is composed of supply-type, short answer questions of the sentence completion variety. It was designed to sample the amount of factual information and informed opinion the patients had absorbed and were able to recall at the time of testing. It is called a "knowledge" test, using knowledge in the sense of "knowledge of facts or recall of specific and isolable bits of information.[4] The subject matter

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[1] Scott Briar and James Brieri, "A Factor Analytic and Trait Inference Study of the Leary Interpersonal Checklist," Journal of Clinical Psychology, XIX (April, 1963), 193-198.

[2] Edgar Buros, editor, Sixth Mental Measurements Yearbook (Highland Park, New Jersey: Bryphon Press, 1965), pp. 266-68, 451-53.

[3] Starke R. Hathaway, "Personality Inventories," in Benjamin Wolman, editor, Handbook of Clinical Psychology (New York: McGraw-Hill Book Company, 1965), pp. 462-64.

[4] Benjamin S. Bloom, et.al., Taxonomy of Educational Objectives Handbook I: Cognitive Domain (New York: Longmans Green and Co., 1956), pp. 15-16.

for the pool of items was TMJ dysfunction. Four areas of knowledge were drawn upon, the etiology of the dysfunction, its symptomology, the affected anatomical structures, and the recommended treatments. All four areas were drawn upon equally for the pool of items. The content validity of the test was established by composing a pool of 120 items which were then submitted to three dental experts on the dysfunction. These experts were asked to select sixty items that they regarded as most important to a knowledge of TMJ dysfunction. The forty questions that are included in the test represent the items on which two of the three judges agreed. The scorer reliability was established by furnishing each scorer with a list of acceptable answers for each question. In addition each scorer was an expert in the subject matter of the test. The inter-scorer reliability coefficient was .85. The test-retest reliability was determined using the Spearman-Brown split half formula. The coefficient of reliability was .95 showing high internal consistency for the test.

Operational Definitions of the Variables

Motivation for Counseling

Two different measures of motivation for counseling were combined to produce a single rating. The first measure was an objective one developed by Timothy Leary and his coworkers in their research on personality change. The major purpose of this reaearch project was the development and validation of a system of personality diagnosis. This diagnostic system is designed to predict the interpersonal behavior of an individual in situations such as counseling, and it can be used to assess the patient's relationship to the counselor, both present and future, his motivation for counseling, and the general level of psychological adjustment. These

inferences and predictions are drawn from the flexibility and adaptability of his interpersonal security operations, and the amounts and kinds of conflicts between personality levels. Compared with other objective measures of personality assessment, this approach offers at least as good an operational analysis as is possible at the present stage of development in personality theory and methodology. In this investigation the system of personality diagnosis developed by Leary was used to measure two variables, the level of motivation for counseling and the degree of discrepancy in self-concepts.

The developers of the Interpersonal System were able to establish a rank order of degree of motivation for counseling among the eight diagnostic categories of personality. Those patients categorized as "Blunt, Skeptical, Docile, or Modest" were ranked as highly motivated. Patients described as "Cooperative, Responsible, Managerial, or Competitive" received a rank indicating less motivation. Finally, patients whose response to the Interpersonal Adjective Checklist indicated a mixing of personality categories such as "Blunt-Responsible" or "Modest-Cooperative" were ranked as least motivated.

The second measure of motivation for counseling was the clinical judgment of the counselor following the initial interview and testing session. All patients were categorized as "motivated" or "not motivated" for counseling on the basis of the counselor's perception of the presence of psychological problems, that the patient was desirous of resolving these problems, and the counselor's awareness of his own feelings of being able to work successfully with this particular patient. This second measure of motivation was included because of the uncertain validity of so-called "objective measures" and also because of an expected homogeneity of personality within the group. This expectation was based on the results of

a preliminary survey of thirty-seven patients who were overwhelmingly categorized by those personality types that Leary ranked as not well motivated for counseling. Therefore, in an attempt to obtain a greater degree of differentiation or refinement of the measure of motivation, a composite rating was constructed.

Educational Level

The control variable, educational level, consisted of the years of formal education that the patient had completed prior to the beginning of treatment at the Center. This information was obtained in the initial interview.

Initial Measures of Symptom Severity, Knowledge, and Self-Concept Discrepancy

As a refinement of the analysis of the treatment effects of the experiment, the measures of each dependent variable were taken prior to beginning treatment and included as covariable controls.

Severity of the Dysfunction

The dependent variable, severity of the dysfunction, consisted of the rating given by the examining dentist on the TJM Symptom Rating Scale. This rating was based on the number and severity of the symptoms that the patient exhibited at the time of examination.

Knowledge of TMJ Dysfunction

The score that the patient obtained on the TMJ Knowledge Test was taken as the measure of this variable.

Self-Concept Discrepancy

A self-concept discrepancy score which was used as a measure of psychological adjustment was obtained. It consisted of the discrepancy between the diagnostic category assigned to the patient's "real" and that assigned to his "ideal" self-description as reflected in the system of personality diagnosis employed by Leary and incorporated into the Interpersonal Adjective Checklist scoring procedures.

Counseling Outcome

The clinical judgment of the counselor as to the outcome of the counseling sequence was expressed in terms of a rating ("improved", "unchanged", or "deteriorated") assigned to each participant in the dentistry and counseling program at the conclusion of treatment. This rating was based on the counselor's perception of the degree to which the patient's dysfunction had ceased to be an emotional problem for him with consequent improvement in overall functioning.

Information Seeking Activity

At the conclusion of treatment each patient in the experimental group was assigned a rating indicating whether or not he had, on his own initiative, engaged in any form of study or other inquiry regarding TMJ dysfunction during the course of the experiment.

Procedures for Data Analysis

The statistical procedures used in the analysis were those common to multivariate analysis with covariance adjustments. These procedures were embodied in a computer program written in FORTRAN by Dr. Norio Shioura of the Computer Center, University of Illinois at the Medical Center, Chicago. The usual "F" test was used to assess the significance of the regression coefficients in the analysis of variance, and the "t" test for the correlation coefficients. In addition, the squared correlation coefficient was obtained for all significant associations between the dependent variables and the independent control variables to determine the magnitude of the associations observed.

Results

Demographic and Personality Data

The demographic and personality data obtained by interview and psychological testing of the patients participating in the experimental programs prior to the inception of dental treatment provide a relatively detailed picture of these TMJ patients. These data indicate that the TMJ patients, as a group, were predominantly female (49 patients), Caucasian (52), married (39), young (median age = 30 years), and better educated than the national average (median education level = 12th grade). These patients were overwhelmingly classified in the core dominant of the categories of the Leary system of personality diagnosis, the Managerial and Responsible categories. A substantial minority of them (21) gave evidence of significant discrepancy in self-concept. The motivation for counseling in this group was bimodally distributed between a high motivation group (26) and a low motivation group (24). A small minority (10) engaged in independent information

seeking activity, and a substantial minority (24) gave indication of elevated scores on the MMPI that are commonly interpreted as indicative of inner tension.

Testing of the Major Hypotheses

First Major Hypothesis

The first major hypothesis posited a superiority of the programs that combined dentistry with patient education over the program of dentistry alone in the alleviation of the dysfunction. The analysis of variance indicated that the addition of supplemental education programs made a significant difference ($p = .02$) in treatment outcome for this group of patients (Table 1).

Table 1.

The Analysis of Variance for the Patient Education and Dentistry Groups vs. The Dentistry Alone Group on the Dependent Variable, Final Dysfunction Severity Scores

Source of Variation	Sum of Squares	DF	Mean Square	F	P
Between Groups	252.30	1	252.30	4.88	.02
Within Groups	2998.30	58	51.69		
Total	3250.60	59			

The mean scores for the groups showed that the two patient education programs were much more effective in reducing symptoms than the program of dental therapy alone. This superiority of the dentistry and education programs of counseling and instruction is consistent with the views of the two schools of clinical thought that emphasize the emotional and cognitive components of the dysfunction. While it is true that the dentistry program by itself was also quite effective, the superiority of the education and dentistry pro-

grams in alleviating the dysfunction was so clear that it warrants the inclusion of such ancillary programs in routine clinical treatment.

This experiment presented no evidence of a significant difference in the comparative effectiveness of the two education programs in alleviating the disorder (Table 2).

Table 2.

The Analysis of Variance for the Three Treatment Groups: Dentistry Aone, Dentistry and Counseling, and Dentistry and Instruction on the Dependent Variable, Final Dysfunction Severity Scores

Source of Variation	Sum of Squares	DF	Mean Squares	F	P
Between Groups	253.90	2	126.95	2.41	.10
Within Groups	2996.70	57	53.57		
Total	3250.60	59			

This finding was contrary to an expectation that the majority of these TMJ patients, either because of their personality type or because they had no disturbing emotional problems, would be inclined to find the tutorial program more congenial than either the counseling or the dentistry alone programs presumably resulting in a significant difference in their response to treatment as measured by final dysfunction severity scores in favor of the instruction program.

Second Major Hypothesis

In evaluating the effectiveness of the instructional programs, an important consideration was whether the cognitive goal of knowledge of factual information about the dysfunction and its treatment - had been attained. To avoid as much as possible a confounding of the two education programs, the tutor consciously strove to avoid any discussion of the

patient's personal life or emotional problems. The discussion was kept relatively impersonal and focused on the content of the instructional program. The function of the tutor was primarily to instruct the patients in a definite body of factual information and to answer the patients' questions. The whole program further implied that the patient was capable of exercising a large measure of control over the incidence and severity of episodes of pain and attendant limitation of function of the jaw by the way in which he dealt with the physical, biological, and emotional stresses accompanying daily living. On the basis of these considerations about the nature of the instructional program, it was expected that patients participating in the tutorial sessions would learn more about the dysfunction. The differences in final knowledge scores for the three groups were highly significant and supported the expectation embodied in the second major hypothesis. (Table 3).

Table 3.

The Analysis of Variance for the Three Treatment Groups on the Dependent Variable Final Knowledge Scores

Source of Variation	Sum of Squares	DF	Mean Square	F	p
Between Groups	12453.03	2	6226.51	52.53	.001
Within Groups	6755.15	57	118.51		
Total	19208.18	59			

The patients in the instruction group far surpassed the patients in the group who did not participate in a patient education program in their ability to recall the factual information on TMJ dysfunction sampled by the TMJ Knowledge Test. Over the course of the experiment the patients in the

dentistry alone group learned almost nothing about TMJ dysfunction. There were no "information seekers" in this group. The patients in the dentistry and counseling group, however, did considerably better on the test. That this group included seven of the "ten information seekers" and that these individuals were the high scores account for the higher group mean.

Third Major Hypothesis

The third major expected outcome of this experiment was change in the amount of self-concept discrepancy that the patient manifested after treatment. TMJ dysfunction is alleged to have a large psychosomatic component. Hence as the emotional stresses in the patient's life subsided, it was thought that the severity of the physical dysfunction would also be alleviated. The Pearson Product Moment Correlation computed to analyze the relationship between final measurements of dysfunction severity and self-concept discrepancy indicated a positive association (the predicted direction), but not at an acceptable level of significance ($p = .10$). Despite the lack of statistically significant evidence, the direction of the association and the significance level attained suggest that were a larger group studied, a clearer trend might be discovered. The individual and average scores for the groups indicated an overall reduction in self-concept discrepancy over the course of treatment. Further, if the cut-off score suggested by the Leary research group is used for "normal" self-concept discrepancy, there were eleven patients initially and fourteen finally in the dentistry group with normal self-concept discrepancy scores. In the counseling and dentistry group, there were nine initially and sixteen finally, and in the instruction and dentistry group there were fourteen initially and sixteen finally who gave no evidence of conflict over their

"real" and "ideal" self-concepts. These data lend further support to the observation of an overall reduction in self-concept discrepancy. This trend was particularly noticeable in the counseling group.

The lack of conclusive support for the hypothesis gave rise to the question whether self-concept discrepancy was indeed the best measure for evaluating the patient's feelings of self-acceptance and satisfaction. This question took on added weight in view of the growing controversy over the significance of discrepancy in self-concept.[1] There was also the possibility that the rather complicated scoring procedures of the Leary system of personality diagnosis may have obscured evidence of the feelings of well-being resulting from alleviation of the dysfunction in the case of some, and from the acceptance and emotional support the counseling program was designed to provide. Consequently, it was decided to subject the data to a second analysis. This time a simpler criterion of psychological well-being was selected. The "real" self-descriptions of the Interpersonal Adjective Checklist of each patient were scored for the number of negative statements--determined on the basis of common social acceptability--prior to and following treatment. The results of this analysis are contained in Table 4.

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[1]Phyllis Katz and Edward Zigler, "Self-Image Disparity: A Developmental Approach," Journal of Personality and Social Psychology, V, No. 2 (February, 1967), pp. 186-195.

Table 4.

Group Averages of the Number of Negative Self-Referrant Expressions Checked on the Interpersonal Adjective Checklist Prior to and Following Treatment

Dentistry Alone		Dentistry and Counseling		Dentistry and Instruction	
Initial	Final	Initial	Final	Initial	Final
8.50	9.30	14.05	7.45	10.55	9.90
σ 10.04	σ 8.94	σ 6.55	σ 5.31	σ 13.00	σ 8.30

It is quite clear from the group averages that the counseling program had a very large effect upon the patients' tendencies to check negative self-referrant items on the checklist. When a comparison was made between the n negative self-expression scores of the total group, however, there was no significant association between final dysfunction severity scores and a patient's tendency to use negative expressions in describing himself. ($r = +.03$)

The absence of a significant trend in the relationship between final measures of dysfunction severity and self-concept discrepancy indicates that patients may react differently to improved health. For some, it may be that their illness represented certain secondary gains that vanish with improved health. Consequently, such individuals might well be more dissatisfied with themselves as their health improves. For other patients, who could be characterized as "stress reactors" in that they may react to the stresses and strains of living through illness, improved health may be a sign of increased self-satisfaction. Finally, there may be patients whose illness is

related to structural pathology and whose improved health is completely unrelated to their attitudes toward themselves, especially if these individuals had very little self-dissatisfaction to begin with.

Testing of the Minor Hypotheses

First Minor Hypothesis

The three minor hypotheses were concerned with the possible existence of subgroups of patients within the various treatment groups. Such subgroups might be expected to respond to treatment in a manner different from the majority of the group to which they belong. The first minor hypothesis states that the patients who have greater motivation for counseling but are not assigned to one of the patient education programs will be adversely affected in that their degree of self-dissatisfaction, inferred from self-concept discrepancy, will remain high or will increase. The reason underlying this hypothesis was that both patient education programs provided a great deal more interpersonal contact with a helping figure--the tutor or counselor--that, it was assumed, these individuals would find congenial. The partial correlation coefficient between motivation rank and final self-concept discrepancy score for this group of TMJ patients was in the expected direction and highly significant $1 = -.63$ ($p = .005$).[1] Further, for this group of patients, those who were initially ranked as having greater motivation for counseling were also ranked among the more severely afflicted with the dysfunction at the conslucion of treatment, $r = -.43$ ($p = .05$). Further confirmation of the underlying assumption, i.e., the usefulness of a counseling program for many of the highly motivated patients, is provided by the fact that in the other two groups the two variables of motivation and self-concept discrepancy had low correlations.

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[1]The scale direction for measuring motivation was from most to least so that a "1" was the highest rank and a "5" was the lowest.

This lack of association is in strong contrast to the highly negative correlation observed in the dentistry alone group.

Second Minor Hypothesis

The second minor hypothesis reflects an expectation that individuals judged to have benefited from the counseling sequence will also be judged less severely ill at the conclusion of treatment. In other words, it was thought that if TMJ dysfunction is related to nervous tension, the patients who are judged less tense at the conclusion of the experiment will also be less severely afflicted with the dysfunction. The partial correlation coefficient between the counselor's evaluation and final symptom ratings for this group was significant and in the predicted direction (r -.38; p .05).

Third Minor Hypothesis

The final hypothesis expressed the thought that those less motivated for counseling would respond best to the program of patient education that offered a cognitive, factual approach to TMJ dysfunction. Just as the motivated would be expected to respond less well to a non-counseling program, the non-motivated would be expected to respond best to a cognitive education program. The partial correlation between these two variables of motivation and final dysfunction severity scores in the instruction group was r .07, almost a zero correlation. This investigation furnished no evidence for an association of counseling motivation and response to an instructional treatment program.

Other Statistically Significant Results

In all groups initial knowledge scores were the best predictors of final knowledge scores (r .86, .63. and .63). Only in the dentistry alone group did initial measures of the other two dependent variables, dysfunction severity and self-concept discrepancy appear to be highly correlated with final measures (r .63, .78).

Patients who engaged in information seeking both knew more and were physically improved at the conclusion of treatment (r .75 and -.55).

Discussion

General Overview

One of the principal motives that prompted the experiment initially was that the treatment of TMJ dysfunction offered the possibility of studying the nature and effect of three forms of important human activity upon a group of subjects in a single setting. Because of the complex interaction of the factors apparently involved in the dysfunction, it was possible to set up, under controlled conditions, two distinctive sets of educational experiences--an affective set, counseling, and a cognitive set, instruction, and to compare them with the effects of a non-educational set of experiences, a course of dental treatment.

The results of the experiment viewed in the context of previous research indicate that:

1. Dental treatment combined with an ancillary program involving personal interaction whether in an educational program of instruction or counseling is superior to a program of dental treatment alone in the alleviation of painful physical symptoms of TMJ dysfunction.

2. A program of instruction and dental treatment is superior to dental treatment alone or combined with counseling in affecting the learning of information about the disorder.

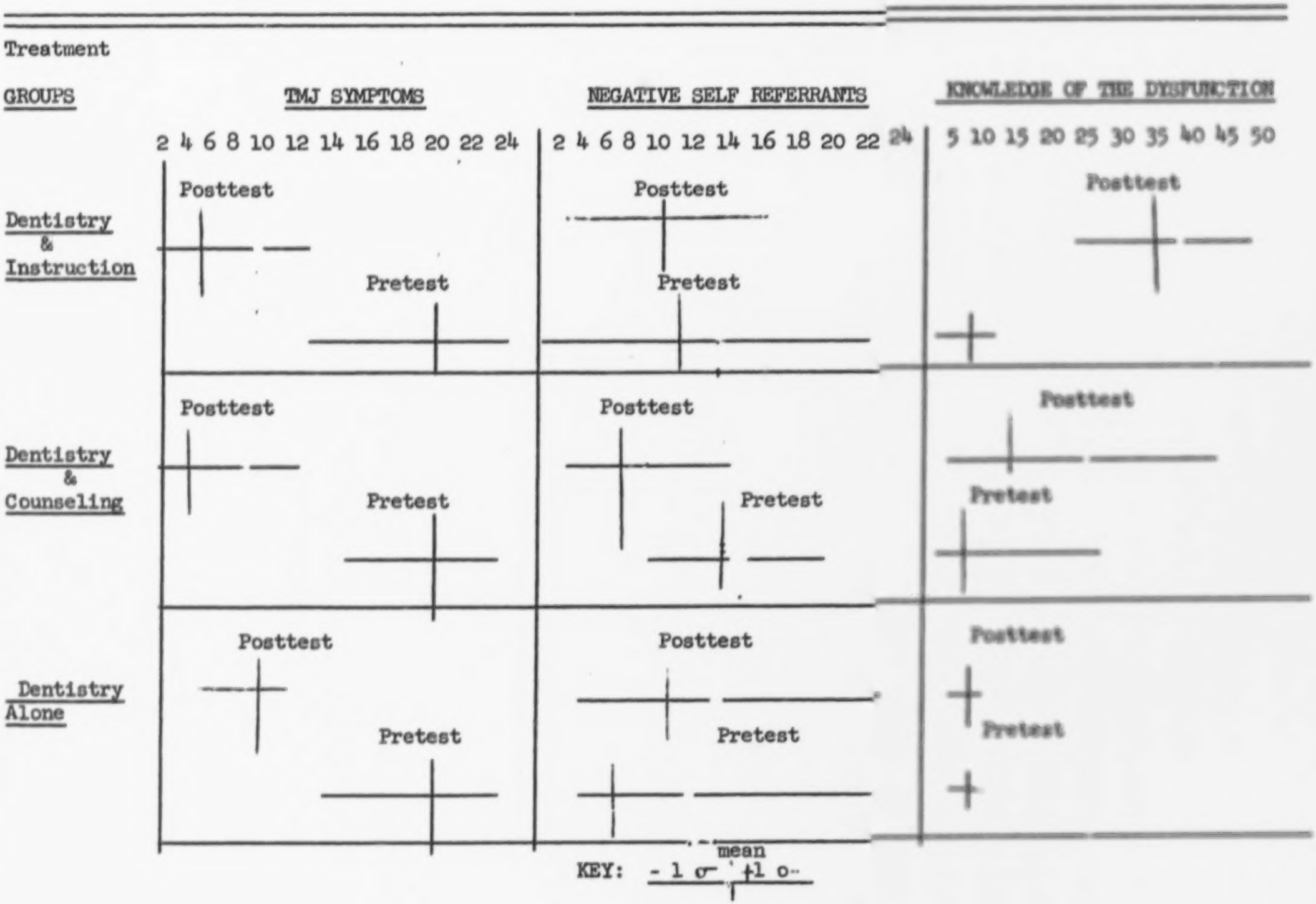
3. A program of counseling and dental treatment is superior to either dentistry alone or combined with instruction in decreasing a TMJ dysfunction patient's negative self-referrant expressions.

This investigation in demonstrating the effectiveness of the dentistry and education programs underscores sharply the effects of personal relations and interaction upon the relief of painful symptoms; the effects of instruction upon learning; and of counseling upon negative feelings about oneself. The results are presented graphically in Figure 1.

The ambiguity of the results obtained relative to the effect of the various programs upon self-concept discrepancy would seem to raise further questions as to the real significance of this discrepancy and its suitability as a global measure of adjustment.

The experimental results also raise several new questions for the health professions. The acceptance of patient education programs is increasing but this acceptance is still often limited in terms of the number of conditions for which it is thought appropriate or in terms of the time and resources devoted to the development and implementation of such programs. That the educational programs were clearly more effective than the dentistry program alone warrants further investigation of this approach in a broad range of medical settings and problem areas.

FIGURE 1.-- A Comparative Graph of the Means and One Standard Deviation for the Three Treatment Groups on the Dependent Variables TMJ Dysfunction Severity, Negative Self-Referrants, and Knowledge of the Dysfunction.


Treatment
GROUPS
TMJ SYMPTOMS
NEGATIVE SELF REFERRANTS
KNOWLEDGE OF THE DYSFUNCTION
2 4 6 8 10 12 14 16 18 20 22 24
2 4 6 8 10 12 14 16 18 20 22 24
5 10 15 20 25 30 35 40 45 50
Dentistry & Instruction
Dentistry & Counseling
Dentistry Alone
Posttest
Pretest
mean
KEY: - 1 σ +1 σ

Implications for Patient Education

The data clearly indicate not only the importance of the psychological dimension in the alleviation of the dysfunction for many TMJ dysfunction patients, but also that the influence of these psychological factors varies among them. Further, direct efforts to alleviate the dysfunction through patient education programs are considerably more effective with the majority of these patients than the strictly biomechanical approach of dental therapy. The conclusion that brief (twelve hours), short-term (six months), symptom-oriented, and supportive counseling is an effective component of treatment for TMJ dysfunction is well founded in this experiment. Another effective adjunct to treatment based on the results of this experiment would be programs of instruction consisting of factual presentations of the nature and treatment of a particular disorder, along with prescriptions for patient management of the condition. Because of the differential response evident among the patients studied, it seems clear that no single one of the programs is best for all patients. In general, the patients in all groups tended to improve under treatment. The superiority of the patient education programs emphasized the role that the attainment of information and that supportive and accepting counseling can play in the alleviation of painful physical TMJ symptoms. In the light of the clear superiority of the patient education and treatment programs over the non-educationally oriented programs of treatment new questions are posed for the health sciences and for those who advocate a purely biomedical approach to disease.

Implications for Program Planning

Increasingly in the field of adult education the professional educator is called upon to diagnose the needs of a group and design a program to meet those needs. The research reported in this dissertation took shape in the process of diagnosing needs and designing a program. The major results of this experiment show quite clearly that it is indeed possible to design educational programs that will accomplish distinct objectives. In this case a counseling program was designed to achieve a specific affective goal, the improvement of the patient's attitude toward himself; and an instruction program was developed to provide the patient with information on the nature of the disease and its management. It was also felt that the personal interaction involved in tutoring and counseling would have a positive effect upon the patient's response to dental treatment. The results of the experiment tend to support such a rationale for the development of ancillary patient education programs as an integral part of the treatment process.

When confronted with an "area of need" the adult educator working in the field of patient education needs to consider carefully both the patients who will participate in the program and the nature of their affliction. A disease whose course is affected by the patient's consciously controlled behavior, level of psychological adjustment, and physical state can be approached at any or all of these levels. Frequently it is impossible to determine which of these factors is the most significant. Hence, the development of an educational and treatment program that takes into account as many of these factors as seems reasonable, given the nature of the disorder and the patients affected, is a more effective approach than a "single factor" program. In the field of the health sciences there is an increasing

tendency to view disease as a multicausal phenomenon. In line with this development patient treatment programs that embrace more than the solely physical dimensions of the program will be more effective than those programs that attempt to deal solely with the biomechanical aspects. In emphasizing the positive results of the investigation, the limitations inherent in this particular experiment must not be overlooked.

Limitations of the Present Investigation

The principal weakness of the present experiment was the lack of control over the variable of tutor personality and counselor personality for the two patient education programs. Certain practical considerations of the setting and resources available made such control impossible.

A second limitation was a further obscuring of any distinctive effects of the two education programs, both of which used the investigator himself either as tutor or as counselor. An effort to safeguard the distinctiveness of each program was made by having the tutor play an information-giving and objective role, while the counselor was concerned with the patient's feelings, empathic and more an attentive listener than an information dispenser. However, a great deal of "personal contact" was common to both programs.

A third limitation was a lack of analysis of the dynamics of the instructional or counseling sessions and, in particular, the impact of the personality of the investigator upon all of the patients in the patient education programs. Current thought in research circles argues that such an emphasis is a much more fruitful line of investigation than the more traditional outcome studies. Further, in evaluating the effects of counseling motivation in this experiment, it is important to note that one measure of motivation level, the Leary ranking system, indicated that the patients in

the three treatment groups fell overwhelmingly in the "low motivation" categories. The lack of range on this variable may account for the low negative correlations. The addition of counselor's estimate to produce a composite measure may have provided a spurious spread as the counselor's judgment, which was largely intuitive, may well have been based on factors irrelevant to counseling outcome, as defined in this investigation or to other variables involved.

Finally, an important variable--particularly in the light of the differential response of the patients--would have been the expressed preference of the patients for involvement in the three programs. No data was gathered on this potentially significant variable, however. Also, the dentists were asked to behave in what may be regarded as an atypical manner. They were instructed to avoid discussing the patient's affliction with him. Under normal circumstances a dentist may provide tutoring and counseling to his patients. Therefore, the dentistry alone treatment constituted an atypical dentist-patient relationship.

In addition to furnishing evidence for an empirical evaluation of these patient education programs , this experiment was also related to a large body of previous research in education, counseling, and the health sciences. Bearing in mind the limitations of the present investigation it is appropriate to consider the ramifications of this study as it relates to the ongoing stream of research in the behavioral sciences.

The experiment clearly demonstrated the utility of the analysis of the educational process developed by Bloom and his associates both for the task

of conceptualizing the programs and for the task of developing an experimental strategy for their empirical validation.[1] The extension of the educational process beyond the narrow confines of the classroom advocated by Bloom, Rogers, and Devereaux made possible an understanding of patient education that emphasized the basic relationship of instruction and counseling on the one hand and of education and treatment on the other.

The experimental results also furnished qualified support for all three of the major shools of thought on the etiology and treatment of TMJ dysfunction, and in so doing give encouragement to advocates of a multicausal explanation of the disorder.[2] Previous research has isolated certain social and psychological factors as common to victims of the dysfunction--better than average education, dominant personality, etc.[3] These results were reaffirmed in the present study. Experimental investigations of psychotherapy and instruction have indicated that previous level of education is an important factor related to a patient's response to these programs.[4] This result was supported for the instruction and dentistry program, but did not appear to be an important factor in attribution of motivation for counseling or in outcome of the counseling process in this experiment.

In the light of the contributions of this experiment to the growing body of knowledge on patient education programs, and in the light of its limitations, certain aspects of the present study suggest further avenues of investigation for succeeding researchers.

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[1] Bloom, op. cit.

[2] Fonder, op. city.

[3] Franks, "The Social Character," op.cit.

[4] Syme, op. cit. and Spivak, op.cit.

Suggestions for Further Research

One of the major weaknesses of this investigation was the lack of control over the personality variable of the tutor-counselor. The results of this investigation were sufficiently promising to suggest that the study be replicated with the addition of several counselors and tutors so that this variable could be randomized. Another approach might be to enlarge the sample so that it would be possible to analyze the counselor-patient interaction.

One of the problems in interpreting the results of the experiment was the impossibility of determining whether the two programs of patient education were sufficiently different. This inability stems from the large measure of personal interaction between counselor and client, and tutor and student, that was common to both programs. A future investigation could resolve this problem by using an auto-instructional device, such as programmed text or tape recorder for use by the student without any, or at least a minimum of, interaction between tutor and student.

On the basis of this experiment the approach to program design utilized seems sufficiently practical to serve in a variety of patient education settings. Several studies could be devoted to investigating its workability in other areas of patient education, such as weight control, smoking, clinics, stroke rehabilitation, or emphysema control programs.

Conclusion

This experiment has clearly demonstrated that it is possible--guided by the results of previous investigations--to design programs that effectively attain the specific objectives determined beforehand. It has shown that personal interaction is a significant factor in therapeutic programs, that tutorial sessions are an effective method of imparting learning, and that counseling has a marked effect upon an individual's felings about himself.

For the health professions, and for dentistry in particular it has underscored the importance of educational programs as an integral part of the treatment process.

This dissertation reflects the strengths of an experimental approach to the problem of program design in adult education. It can, perhaps, offer encouragement to others to push further along an avenue of investigation that can often lead to results that are immediately applicable in the larger world of educational practice.